Arctic climate governance via EU law on black carbon?

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International cooperation, environmental protection and climate change are the key elements of the European Union’s (EU) Arctic policy. The EU’s interest in the Arctic has increased gradually over the last decade, and the policy has been streamlined over the years to better respond to the needs of the Arctic region in the context of international cooperation. Short-lived climate pollutants (SLCPs), especially black carbon emitted close to the Arctic region, present a growing threat to the Arctic climate. SLCPs are both dangerous air pollutants and climate forcers, but black carbon is particularly detrimental in the Arctic context. The EU controls black carbon emissions through legislation on air pollution and quality, albeit without specific reference to concerns over Arctic warming. Based on an analysis of the relevant EU laws, the article examines how the EU can have a concrete input in respect of Arctic climate governance, and through this strengthen its Arctic reach. In the EU context, exposing the lack of synergies between climate change and air pollution policies in a specific Arctic context could offer a potential first step.

1 INTRODUCTION

The European Union (EU) has been developing its Arctic policy since 2008.¹ International cooperation and sustainability in the context of environmental protection and climate change have been identified as the overall objectives of the EU’s revised Arctic policy.² The EU is now eager to deepen its engagement in the Arctic. However, the future development of the EU’s Arctic reach needs to be carefully tailored to complement existing regional governance.

It has been argued that in the Arctic context the EU should focus on areas of policymaking where it has clear priorities and established capabilities, such as the environment and climate change.³ In these areas, the EU has the possibility to contribute positively to Arctic policymaking and to the state of the Arctic environment. The arguments put forward by this article are built on the presumption that the EU’s Arctic policymaking should be directed towards an exclusive framework of activity where the EU has competence to provide a concrete input that has clear and complementary benefits for the region. In this specific context, this article identifies a potential platform for further EU-Arctic engagement that is located within the explicit framework of international cooperation, environmental protection and climate change. This platform is to be found in the EU’s statement that alongside its climate action for 2030 and 2050, it should contribute especially to international efforts to limit the emissions of so-called short-lived climate pollutants (SLCPs), such as black carbon.⁴

Black carbon is a climate forcer as well as an air pollutant that is formed during the incomplete combustion of carbon-based fuels. Black carbon emissions originating from Europe are particularly detrimental in the Arctic context.⁵ This article analyses how the EU contributes to, and complements

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⁴ Commission (n 2) 7.
⁵ PK Quinn et al, ‘AMAP Assessment 2015: Black Carbon and Ozone as Arctic Climate Forcers’ (Arctic Monitoring and Assessment Programme (AMAP) 2015) 1-6.
Arctic climate governance through its internal law on black carbon emissions. The scope of the article is limited to black carbon as a SLCP from an Arctic perspective. The article considers the EU legislation of key relevance in this context, such as that on air pollution and air quality, road transport emissions and ecodesign requirements for appliances used in residential wood combustion. International regulatory developments on SLCPs and black carbon are discussed elsewhere in this special issue and are therefore not covered in this article, except where directly relevant to the EU. Based on the analysis, this article argues that the EU can indeed contribute positively to the efforts to tackle Arctic climate warming through its internal legislation controlling black carbon emissions especially. This is already taking place through existing legislation.

The article also evaluates whether the EU could do more to abate black carbon emissions that drift from the EU to the Arctic. Scholars have concluded that measures tackling black carbon emissions in particular are needed to effectively mitigate its negative impact on the Arctic. The article finds that the EU’s current regulatory approach could be strengthened to tackle black carbon emissions not only as an air pollutant, as is the case under its current regulatory approach, but also as a detrimental Arctic climate forcer. Exposing the lack of synergies between climate change and air protection policies in the specific Arctic context could perhaps offer a potential first step. Furthermore, addressing black carbon as the factor tying climate and air policies together, and acknowledging the relevance of this interlinkage for the Arctic region, could help the EU to underline its relevance in the Arctic sphere. However, integrating climate and air perspectives on black carbon will not automatically lead to better policies on black carbon with Arctic relevance. Therefore, it is necessary to identify and concretize the specific links that have potential to achieve greater policy integration and to realize co-benefits from these synergies. This article shows that, in the Arctic context, residential wood combustion and biomass burning are examples of activities offering interlinkages that offer potential for greater policy integration.

Finally, putting this into the broader context of regional cooperation, research indicates that ‘a small number of cooperating nations within the Arctic region itself could have a large impact on the problem of regional warming’. The EU could establish a role within the context of such cooperation by exerting an influence upon the relevant international frameworks, but also by focusing its cooperative efforts on the EU’s priorities and regulatory strengths in the regional context. The article argues that through its regulatory action on black carbon, the EU can provide a concrete complementary input to Arctic climate governance and cooperation, and thus strengthen its Arctic reach.

Section 2 briefly describes the context of the EU’s engagement with the Arctic. Section 3 discusses the urgency of the need to tackle black carbon as well as the reasons why black carbon demands special attention from an Arctic perspective. Section 4 outlines and analyses the EU regulatory framework relevant for tackling black carbon emissions in the Arctic. The EU regulatory framework is analysed further in Section 5. Section 6 concludes.

2 THE EU AS AN ARCTIC ACTOR

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9 The EU is, for example, a leading partner in the Climate and Clean Air Coalition (CCAC). The CCAC is a voluntary partnership committed to improving air quality and protecting the climate through actions to reduce SLCPs. See <http://ccacoalition.org/en>.
The EU contributes to Arctic research, development and Arctic governance principally through extensive funding, but also by participating in Arctic Council (AC) proceedings as an ‘observer in principle’ as well as by exercising its competence in the context of the European Arctic. Finland, Sweden and Denmark are Arctic countries as well as EU Member States, and the EU maintains close relations with Iceland and Norway through the European Economic Area (EEA). From an internal EU law perspective, the EU’s primary legislation expressly mandates external action in the context of international cooperation, the environment and climate change.

In addition to the objectives stated in the EU’s public policy on the Arctic, there are other, perhaps more tangible drivers that explain the EU’s interest in the region, ranging from resource-oriented interests to environmental concerns. For example, the EU is a major consumer of Arctic seafood as well as a large importer of oil and gas from the region. However, the EU may also be regarded as bearing a degree of moral responsibility for the rapidly changing situation in the Arctic through its importation of natural resources extracted from the region; the emission of greenhouse gases (GHGs), which contribute to climate change in the Arctic; long-range pollution; and increased shipping and tourism. Due to this clear European Arctic impact, the Arctic is identified as a priority region in the European Commission’s Seventh Environmental Action Programme.

When approached from these multiple perspectives, the EU can indeed be considered as an Arctic actor with legitimate interests in, or concerns relating to, the region. However, the extent and authenticity of the EU’s Arctic involvement has also been tested over the years. The EU’s policy approach has been criticized for being too vague and lacking in clear vision and direction. Then again, the guarded approach taken by other Arctic actors in response to the EU’s readiness to participate in Arctic affairs has also ‘nudged’ the EU to be more elaborate and careful when expressing its views in relation to Arctic issues.

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10 The EU is one of the largest contributors to Arctic research. Approximately €200 million has been committed to Arctic research projects under the EU Seventh Framework Programme, excluding the individual contributions from EU Member States; F Immler (ed), ‘Arctic Research Funded by the European Union’ (Directorate-General for Research and Innovation 2014) 8-11.

11 While the EU’s application for observer status is being considered by the Arctic Council, the EU can continue to attend its meetings as an ‘observer in principle’. Stepień and Koivurova (n 3) 36. According to research analysing stakeholder participation in the Arctic Council Ministerial, Senior Arctic officials and subsidiary body meetings, the EU has been among the most active of the participants in all meetings within the observer groups. See S Knecht, ‘The Politics of Arctic International Cooperation: Introducing a Dataset on Stakeholder Participation in Arctic Council Meetings, 1998–2015’ (2017) 52 Cooperation and Conflict 203, 210-211.

12 The EEA unites the EU Member States and the three EEA European Free Trade Association (EFTA) States (Iceland, Liechtenstein and Norway) into an internal market governed by the same basic rules. The Agreement also covers the environment by means of horizontal provisions that ensure the proper functioning of the internal market. See Agreement on the European Economic Area [1994] OJ L1/3 art 1(f), 73 and 74. Annex XX to the Agreement, ibid, contains specific provisions on protective measures in relation to the environment.


16 For example, Canada, Norway and Russia have taken a cautious approach towards European engagement. See, e.g., A Airoldi (n 3) 29-32. See also Stepień and Koivurova (n 3) 34-40.

17 The EU-Arctic Council nexus is not discussed in detail in this article. See, e.g., Stepień and Koivurova (n 3); Airoldi (n 3) 13-14; P Kobza, ‘Civilian Power Europe in the Arctic: How Far Can the European Union Go North?’ (College of Europe 2015) 6.

18 Stepień and Koivurova (n 3) 27-28, 42 and 53.
The EU plays a central role in relation to European black carbon emissions, not only in terms of regulatory impact but also as an emitter of black carbon – the black carbon emitted within the EU has a direct impact on the Arctic. The EU has the regulatory competence to control black carbon within its jurisdiction. It also has an internal mandate to deal with regional environmental problems, especially climate change, as a joint concern of its Member States. Furthermore and very centrally, the EU is motivated to participate in Arctic (climate) governance. Black carbon offers a good platform for such participation.

3 THE URGENCY OF THE NEED TO TACKLE BLACK CARBON EMISSIONS

Black carbon emissions refer to carbonaceous aerosols that are emitted from the incomplete burning of fossil fuels, biofuels and biomass, together with other particulate matter (PM) emissions. In Europe, major sources of black carbon include diesel-driven vehicles and residential wood combustion. Black carbon is also a powerful SLCP, a deadly air pollutant and the second most important pollutant, after carbon dioxide (CO₂), forcing climate change. It has a warming impact on the climate that is 460 to 1500 times stronger than CO₂. SLCPs are a group of gases and particulates small enough to remain airborne. Their lifespan in the atmosphere is relatively short (from a few days to a decade). To mitigate the effects of long-term warming of the Arctic, drastic cuts in CO₂ emissions are a priority. However, in the short term (up to 2050), reducing SLCP emissions will provide a prompt and positive response to the challenge presented by Arctic climate change. Sources that emit black carbon also emit other SLCPs that may either cool (such as sulfates) or warm the climate. However, black carbon emissions, independent of these co-emitted SLCPs, have a positive forcing and therefore warm the climate. The scientific consensus is that it is not possible to reduce the emissions of black carbon alone, but it is possible to target emission reduction measures to sources that have a high share of black carbon.

This article focuses on black carbon’s negative climate impacts in the Arctic context. The Arctic is very vulnerable to climate change and is projected to warm more than any other region on earth. Over recent decades, temperatures in the Arctic have increased at twice the global rate. It is

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19 M Strahlendorff et al, ‘Climate Change in the Arctic’ in A Stepien et al (n 3) 71.
20 Black carbon is an aerosol specie, whereas particulate matter is a widespread air pollutant that consists of a mixture of solid and liquid particles suspended in the air. It is always emitted with a mix of other air pollutants and GHGs. See, e.g., Z Klimont et al, ‘Global Anthropogenic Emissions of Particulate Matter Including Black Carbon’ (2017) 17 Atmospheric Chemistry and Physics 8681.
25 Black carbon, methane, tropospheric ozone and hydrofluorocarbons.
28 Bond et al (n 23) 5381; Klimont et al (n 20) 8682; Sand et al (n 8) 287.
estimated that 20 to 25 percent of warming in the Arctic is caused by black carbon.\textsuperscript{30} Black carbon warms the climate both directly and indirectly. It is an absorbing aerosol and, as it absorbs solar radiation, it warms the atmosphere (direct effect). Black carbon affects the microphysics of clouds, which then affects the climate (indirect effect). Finally, when black carbon falls on snow and ice surfaces, it reduces the albedo effect and enhances the absorption of radiation, which then warms the lower atmosphere and accelerates snow and ice melting (indirect effect).\textsuperscript{31}

The effects of aerosols are seasonal and regional in nature.\textsuperscript{32} The Arctic is highly sensitive to local black carbon emissions and those transported from sources close to the Arctic.\textsuperscript{33} According to estimates, the European continent contributes more than half of all black carbon deposited in the Arctic, while approximately 60 percent of global emissions of black carbon are generated in Asia (China and India, especially).\textsuperscript{34} Research also shows that European emissions are a significant source of surface black carbon in the Arctic, due to the proximity of many European sources; while East Asia is the largest contributor to black carbon in the upper troposphere. In fact, most of the European black carbon emissions that transport to the Arctic are emitted north of 40°N.\textsuperscript{35} Europe and North America are the regions in which there is the greatest need to introduce measures to tackle black carbon.\textsuperscript{36} Although black carbon concentrations are already on the decline, mostly because of the adoption of new technical solutions, there is plenty of scope for further emission reductions through existing technologies, especially in relation to domestic wood burning.\textsuperscript{37} Controlling black carbon emissions in the EU would reduce their detrimental effect in the specific Arctic context with co-benefits for air quality. The next section assesses how black carbon is currently regulated under EU law and how this regulatory framework could be strengthened to introduce additional benefits in the Arctic context.

4 EU LAW ON BLACK CARBON

This section focuses on key EU legislation covering sectors or sources that produce the relevant black carbon emissions in the Arctic context. The vast majority of the black carbon emissions in the EU originate from the transport and residential sectors.\textsuperscript{38} Domestic heating alone is expected to account for nearly 70 percent, and transport for 14 percent of EU black carbon emissions by 2030.\textsuperscript{39} In addition, legislation on air pollution and air quality is of importance and is covered in the discussion below. One point that the following analysis aims to highlight is that while the challenges presented by black carbon impacts in the Arctic mostly relate to climate change, most of the EU’s legislation on black carbon addresses the threat it poses as an air pollutant (and not as a climate forcer). This

\textsuperscript{30} Hildén et al (n 26) 2. It should be noted that there are substantial uncertainties in the emission estimates of key SLCPs, especially black carbon. See Bond et al (n 23; Quinn et al (n 5) 34-36.
\textsuperscript{31} Bond et al (n 23) 5380-5386; Quinn et al (n 5) 2.
\textsuperscript{32} Collins et al (n 29) 1060; Bond et al (n 23) 5385; A Stohl et al, ‘Black Carbon in the Arctic: The Underestimated Role of Gas Flaring and Residential Combustion Emissions’ (2013) 13 Atmospheric Chemistry and Physics, 8833, 8833 and 8839.
\textsuperscript{34} S Cavalieri et al, ‘EU Arctic Footprint and Policy Assessment: Report Summary’ (Ecologic Institute 2010) 5; Hildén et al (n 26) 2.
\textsuperscript{35} E Sasser et al, ‘Report to Congress on Black Carbon’ (United States Environmental Protection Agency 2012) 110; Quinn et al (n 23), 13-15; Stohl et al (n 32) 8837; Shindell et al (n 33) 15.
\textsuperscript{36} Shindell et al (n 33) 15.
\textsuperscript{37} MACEB (n 7); Hildén et al (n 26) 2.
\textsuperscript{38} MACEB (n 7) 26.
interface between climate change and air protection policies is, however, not fully reflected in current legislation.40

Furthermore, the EU has legislation in place that focuses on mitigating particle emissions overall. Black carbon is a component of fine particulate matter (PM2.5),41 and thus regulatory measures aimed at reducing PM2.5 also reduce black carbon emissions. Still, from an Arctic climate perspective, measures to tackle black carbon, in particular, are needed. In respect of the group of SLCPs, mitigation of black carbon specifically would contribute most to achieving reductions in warming.42

4.1 Legislation controlling air pollution and air quality

The EU’s air protection policy consists of several interlinked instruments, the most important of which are Directive 2016/228443 (the National Emissions Ceiling Directive or NEC Directive) and Directive 2008/50/EC44 (the Ambient Air Quality Directive or AAQ Directive).45 The recently revised NEC Directive is the first, and thus far the only, EU legal instrument to directly address black carbon. The Directive establishes new national emission reduction commitments (NERCs), applicable from 2020 and 2030, for the main air pollutants (including PM2.5).46 Under these commitments, the EU is set to reduce its PM2.5 emissions by 22 percent by 2020, and by 49 percent by 2030.47 Although the Directive does not set NERCs for black carbon per se, it requires Member States to ‘prioritize’ emission reduction measures for this pollutant when taking action on PM2.5. By ensuring that Member States must explicitly target black carbon emissions when setting the controls to meet their obligations in the context of PM emissions, the NEC Directive therefore maximizes the opportunities to reduce black carbon emissions. If new sectoral legislation on sources with high proportions of black carbon emissions are prioritized, for example by setting ambitious black carbon specific emission standards, the EU could better reap the synergies between climate and air policy.48

The Directive also requires the drawing up, adoption and implementation of national air pollution control programmes (NAPCPs), and the monitoring and reporting of emissions of the pollutants covered by the Directive.49 Thus, the Member States must report their annual black carbon emissions, but only if such inventories are available.50 As to the content of the NAPCPs, the Member States must give priority, when defining what measures they are to undertake to curb PM2.5 emissions, to those that lead to a reduction in emissions of black carbon.51

41 Klimont et al (n 20) 8683.
42 Sand et al (n 8) 287.
45 The EU’s competence to legislate on air pollution controls and air quality stems from the environmental treaty basis contained in TFEU (n 13) art 191-192.
46 NEC Directive (n 43) art 4.
47 ibid. Annex II, table B.
49 NEC Directive (n 43) art 6, 8.
50 ibid art 8(1) and Annex I, table A.
At the international level, the EU and its Member States are party to the Convention on Long-Range Transboundary Air Pollution and its Gothenburg Protocol. The text of the NEC Directive replicates the parts of the 2012 amendment to the 1999 Gothenburg Protocol that cover black carbon. While this amendment has not yet entered into force, the revisions made, including those on black carbon, apply within the EU regardless of the international legal status of the amendment. In this sense, the EU is one step ahead of the wider international community in acknowledging black carbon as a dangerous air pollutant.

The AAQ Directive sets standards and objectives for air quality in the Member States. It lays down an assessment regime and criteria covering PM2.5 emissions as well as additional PM2.5 objectives concerning exposure to fine particles. The Directive requires Member States to take ‘all necessary measures not entailing disproportionate costs’ to reduce exposure to PM2.5 and to ensure that concentrations of PM2.5 in ambient air do not exceed the targets laid down in the Directive.

Compliance with the AAQ Directive would lead to substantial reductions in black carbon levels. However, the effectiveness of EU law on air quality is significantly impaired by poor implementation and poor compliance with the current regulatory framework. The EU’s air quality standards suffer from widespread non-compliance, and the stringency with which different Member States apply air quality standards varies significantly. Although air quality has improved across Europe over the past decades, compliance gaps for some key pollutants, such as particulate matter, persist. Most Member States would reach acceptable PM2.5 levels if both the NEC and AAQ Directives were fully complied with. Therefore, further efforts to reduce emissions of air pollutants are necessary to ensure full compliance with the applicable EU legislation.

Climate change and air protection policies are interlinked through SLCPs. PM, black carbon included, is probably the atmospheric component that best exemplifies the climate change and air nexus. Therefore, reducing the concentrations of SLCP pollutants, such as black carbon, is beneficial both in terms of achieving climate change mitigation and in terms of improving air quality. From the perspective of the global cooling effect on climate, achieving the EU’s air pollution and air quality objectives for the 2025-2030 period would have a fairly small impact. However, the regional cooling effects in Europe and the Arctic are likely to be more significant – the EU’s contribution to the

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57 AAQ Directive (n 44) art 5-6.
58 ibid art 15-16.
59 Environmental Audit Committee (n 48) 144.
60 Yamineva and Romppanen (n 40) 196.
61 Commission (EU), ‘Fitness check of the EU Ambient Air Quality Directives’ (2017).
deposits of black carbon in the Arctic is estimated to reduce by about 6 percent compared to the baseline.63

In addition to the NEC and AAQ Directives, other legislative instruments within the EU air policy framework are relevant to PM emissions. For example, Directive 2015/219364 on medium combustion plants and Directive 2010/7565 on industrial emissions also tackle PM. However, large combustion and industrial sources are a minor source of black carbon in the EU because PM emissions from large plants have very low fractions of black carbon. Although these instruments decrease the emissions of PM, they do not have a direct impact on black carbon emissions.66

4.2 Euro standards for the transport sector

Diesel-driven vehicles in the transport sector are among the biggest sources of emissions of black carbon.67 Emissions from transport are controlled through a series of regulations adopted as part of the EU’s regulatory framework (‘Euro’ standards).68 The regulations set increasingly stringent minimum requirements (e.g. pollution control devices such as diesel particulate filters) for air pollutant emissions from different types of vehicles, including passenger cars. PM exhaust emissions have gradually declined69 since the widespread introduction of the Euro standards. For example, between 2000 and 2015, PM2.5 emissions decreased by 42 percent.70 Full implementation of the regulations and their emissions controls would result in further, and significant, PM emission reductions within the EU – the growing use of particulate filters is expected to reduce exhaust-related primary PM2.5 from road transport by almost two-thirds.71

The regulations controlling transport emissions do not directly address black carbon, but PM emissions. However, recent research has identified diesel-driven vehicles and engines as one of the potential sectors for black carbon mitigation.72 Emissions standards that require particulate filters are the most effective option for controlling black carbon in diesel fuels. In addition, even greater gains can be achieved from the use of particulate filters when they are ‘paired’ with low-sulfur diesel fuel.73 In the EU, the maximum sulfur content is already set at 10 mg/kg, which translates into a quite low sulfur content for a fuel (so-called ultra-low sulfur diesel).74 One distinct challenge that presents itself

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66 MACEB (n 7) 46.
68 The emissions regulations date back to the 1970s, and the first Euro standard was introduced in the 1990s. See, for example, the latest amendment to the Euro standard series (light passenger cars): Commission Regulation 2016/427/EU of 10 March 2016 amending Regulation (EC) No 692/2008 as regards emissions from light passenger and commercial vehicles (Euro 6) [2016] OJ L82/1, which introduced the Real Driving Emissions test procedure (RDE).
69 For example, there was an 80 percent reduction between the Euro 4 and Euro 5 levels for diesel vehicle emissions. MACEB (n 7) 47.
70 European Environment Agency (n 62) 16-18.
71 Parliament (n 62) 62; Lazarus (n 39) 30. See also Shindell et al (n 33) 8-9.
72 International Council on Clean Transportation (ICCT) and UNEP, ‘A Global Strategy to Introduce Low-Sulfur Fuels and Cleaner Diesel Vehicles’ (2016) 4 and 6. See also Bond et al (n 23) 5523.
73 Bond et al (n 23) 5412; ICCT and UNEP (n 72) 18.
74 Directive 2009/30/EC of the European Parliament and of the Council amending Directive 98/70/EC as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions
in relation to emission standards for road vehicles is that they only apply to new vehicles as the requirements are directed at car manufacturers. Without separate action to prompt a ‘retrofit’ of emissions controls to cars it will take decades to clean up the most polluting vehicles.75

From an Arctic perspective, the regulatory measures to tackle black carbon emissions from the transport sector in the EU are relevant in a positive sense. However, although the EU has already managed to reduce PM2.5 emissions from the transport sector, the sector has not seen the same gradual decline in GHG emissions as other sectors.76 Tailored reduction controls aimed at black carbon could introduce some very important co-benefits as well as reduce Arctic warming in the short term. However, the lack of regulatory attention to integrate linkages between climate change and air protection policies is also viewed as weakening the effectiveness of the regulatory framework.

Black carbon emissions and emissions of other pollutants from road vehicles continue to decrease due to efforts made to protect human health from air pollution. The impact of black carbon emissions as well as other non-CO2 GHGs and aerosols can be effectively mitigated by technologies that prevent their formation or lead to their destruction using after-treatments. However, emission control devices such as diesel particulate filters have fuel efficiency penalties that can actually lead to an increase in transport CO₂ emissions. On the other hand, the transport sector is also a significant emitter of aerosols and gases that can have local and regional cooling impacts.77 For example, associated emissions of sulfur compounds, typically released at the same time as black carbon, have a cooling effect.78

Regulating particular emissions for the sole purpose of protecting human health may have the unintended consequence of increasing warming rapidly.79 The mitigation of sulfur emissions is an area where both climate and air quality would benefit from greater policy integration. Therefore, the implementation of these controls could be further enhanced to take into account the need to mitigate climate change and incorporate measures by which to achieve this. In addition to public health benefits, these measures could introduce additional co-benefits in the context of short-term climate change mitigation and help to avoid ‘unintended consequences’80 that may arise due to insufficient regulatory attention being paid to the ‘counter effects’ between the two policy fields (climate change and air protection). On the other hand, however, balancing climate objectives should not result in health objectives being compromised. As the health of human beings and ecosystems is obviously not something that may be ‘sacrificed’ to pursue climate goals, important ethical concerns must also be considered in the health and climate policy context. Therefore, the health benefits to be achieved by reducing GHG emissions and the co-benefits of climate change mitigation through reductions in black carbon specifically need to be examined further but also facilitated through legislation, and put in practice once technologically, and ethically, feasible.81

4.3 Ecodesign


75 See, e.g., Environmental Audit Committee (n 48) 142 and 144.
76 The difference between the two sectors may be seen, for example, in two sets of statistics from the Eurostat service, which show a clear decrease in PM2.5 emissions, but an increase in GHG emissions: see <http://bit.ly/2DQaJ8C> and <http://bit.ly/2lEAm5z>.
78 Hildén et al (n 26) 2; MACEB (n 7) 9.
79 See, e.g., Bond et al (n 23) 5389.
81 Sims et al (n 77) 612; MACEB (n 7) 9.
In the Arctic context, residential wood combustion and biomass burning is a potential area for the development of measures that benefit both climate change mitigation and air quality. Together with diesel-driven vehicles, residential wood combustion has been identified as being responsible for most of the anthropogenic black carbon emissions upon the Arctic.82 In the Arctic context, residential wood combustion principally refers to space heating using wood fuels, biofuels or light fuel oil.83 While residential wood combustion is a major source of black carbon emissions, it is also clearly the source that has most reduction potential.84 At the same time, however, emissions of PM2.5 are also subject to substantial uncertainty due to a lack of precise knowledge about, for example, total wood consumption and the age and model of the stoves and boilers in use. Furthermore, user behaviour in terms of stove operation has a clear impact on residential wood combustion emissions.85

In the EU, Directive 2009/12586 (the Ecodesign Directive) contains a clear regulatory framework for the marketing and use of energy-using products. The Ecodesign Directive is a framework directive. It therefore provides a general framework under which ecodesign requirements for products are set, while product-specific rules and criteria are laid down in implementing regulations. More than 20 such implementing regulations have been issued since the adoption of the Ecodesign Directive.87

Commission Implementing Regulations 2015/1185 on solid fuel local space heaters88 and 2015/1189 on solid fuel boilers89 are particularly relevant to the analysis set out in this article. They lay down specific ecodesign requirements (emission limits) for PM,90 but not explicitly for black carbon or even PM2.5, and are the first two EU legal instruments that tackle emissions from residential wood combustion. It is thought that when fully implemented, the regulatory framework provided for in the Ecodesign Directive could lead to significant reductions of regional PM emissions from residential wood combustion.91 However, the requirements for solid fuel boilers will apply only from 2020 onwards, and the requirements for solid fuel local space heaters from 2022 onwards. Furthermore, the ecodesign requirements will only affect new appliances. As the average lifespan of the appliances targeted by the regulations is quite long, it will take a long time before consumers are actually using new and modern appliances that comply with the emission limits set for PM.92 In addition, the rules do not apply to sauna stoves, which are a major emitter of black carbon in Finland for example.93 In the context of black carbon, the regulations have also been criticized for not being strict enough.94 The new rules tackling residential wood combustion are definitely relevant to future emission levels of PM and black carbon. However, the substantive impact of the measures contained

82 Quinn et al (n 5), 24-27; Hildén et al (n 26) 2; Maione et al (n 63) 55.
83 Stohl et al (n 32) 8837.
87 ibid art 15.
90 See Regulation (EU) 2015/1185/EU (n 88) art 3, point 3 of Annex II, and Annex IV; and Regulation 2015/1189/EU (n 89) art 3 and Annex II.
91 Savolahti et al (n 84) 1497-1498.
92 ibid 1497.
93 ibid 1498.
94 Lazarus (n 39) 9; MACEB ( n 7) 47.
in the ecodesign regulations will be limited, in part because they show a low level of ambition given what is already technically feasible, and in part also because their effectiveness will be weakened due to the long transition periods provided for and because non-new heating appliances in use at the time the new rules begin to apply may still have a long lifespan ahead. Therefore, in its current form the regulatory framework limiting PM emissions from fuel local space heaters and solid fuel boilers will not be able to achieve much-needed fast reductions in domestic PM emissions.

From an EU–Arctic perspective, the full potential for PM and black carbon reduction cannot be achieved without introducing complementary regulatory measures, including black-carbon-specific measures. Measures that reduce black carbon will also reduce PM2.5 proportionally, but measures to reduce PM2.5 will not necessarily reduce black carbon emissions from residential wood combustion. Although the same policy approaches may be used to achieve black carbon reductions, black carbon should be specifically addressed to ensure a concrete and positive impact in terms of actual black carbon emission reductions in the Arctic region. This interface makes residential wood combustion particularly interesting from the point of view of unlocking synergies between climate and air policies.

5 CONNECTING THE DOTS BETWEEN THE EU, BLACK CARBON AND ARCTIC WARMING

The EU is a major source of black carbon deposits in the Arctic. Whereas in the global and regional contexts regulatory measures to control black carbon are just being introduced or implemented, the EU is already contributing to the mitigation of Arctic warming caused by black carbon through legally binding regulatory measures. The measures to control black carbon emissions either directly (i.e. under the NEC Directive) or indirectly through measures to limit PM2.5 emissions (e.g. the Euro standards and the Ecodesign Directive) are of regional relevance to the Arctic. Quite self-evidently, the EU can influence Arctic warming by limiting its own emissions – including SLCPs. However, the interlinkages between the regulatory frameworks analysed here and Arctic warming through SLCPs are not explicitly brought forward within the EU’s policies relating to the Arctic. Could the existing regulatory framework on black carbon offer a platform for the EU to boost its Arctic relevance? And, furthermore, could the EU strengthen its approach to black carbon not only to meet its own internal objectives relating to environmental protection and climate change but also to tackle the problem of regional warming in the ‘external’ context of the Arctic?

There are substantial interactions between EU climate change and air protection policies that are not fully taken into account within the regulatory frameworks, either in general terms or specifically in relation to Arctic climate challenges. In practical terms, however, taking the synergies into account should entail tangible changes to the EU’s approach on black carbon and Arctic warming, together with reflection as to how the EU may best enhance its role as an Arctic actor. Therefore, what avenues exist for further EU Arctic engagement in the context of black carbon and Arctic warming?

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95 Parliament (n 62) 60.
97 See, e.g., Levander and Bodin (n 85) 53.
98 Cavalieri et al (n 34) 2.
99 UNECE Decision 2012/2 (n 54).
100 The most recent regional regulatory development was the Fairbanks Declaration of May 2017 that sets a shared – although legally non-binding – goal of reducing emissions of black carbon between 25 and 33 percent below 2013 levels by 2025. See Arctic Council, ‘Fairbanks Declaration’ (11 May 2017); and Arctic Council’s Expert Group on Black Carbon and Methane, ‘Summary of Progress and Recommendations’ (2017) 15.
101 Commission (n 62) 245.
Despite positive regulatory developments, for example in the context of the NEC Directive, EU legislation does not yet adequately reflect the significance of black carbon in its dual role as both an air pollutant and a climate forcer. The reasons for this include the focus on CO2 as the key climate forcer as well as the uncertainties associated with black carbon’s impacts on the climate. Therefore, perhaps one of the most promising avenues through which the EU can clarify its Arctic policy objectives might be the introduction of measures that focus on black carbon not only as an air pollutant but also as a climate forcer. The interlinkages and potential for positive synergies between climate change and air protection policies are particularly clear in the context of black carbon.

The revised NEC Directive highlights black carbon emissions by enabling the enactment of new legislation to prioritize measures on black carbon. This requirement seeks to prompt Member States to target black carbon emissions explicitly when setting the controls (e.g. emission limits) to meet their obligations in the context of PM emissions. It has been estimated that wider use of best available technologies could reduce the warming effect of black carbon in Arctic regions by 0.25°C by 2050. Targeting the diesel transport and residential combustion sectors is a crucial element of the prioritization of black carbon reductions and, in practice, this should be done by introducing modern technologies. For the transport sector, the controls to eliminate the most polluting vehicles are already in place. In the coming years, black carbon levels are expected to decrease markedly due to the implementation of the Euro standards. However, seen in terms of the SLCP timescale, the emission reductions enabled by the Euro standards within the transport sector will come a bit late. Additional action, including for instance retrofitting old vehicles with modern emission control technology, would help tackle the problem, but might be difficult to enforce.

The regulatory framework laid down in the Ecodesign Directive shows more potential for putting the NEC Directive’s regulatory optimization to use. This framework is sorely needed, because much of the potential to reduce the amount of black carbon produced by residential wood combustion will remain untapped if new measures to tackle these emissions are not introduced promptly at the Member State level. While the regulations controlling residential wood combustion are in place, they will enter into force in 2020 at the earliest, apply only to new appliances, and not cover all relevant appliances that emit black carbon. The regulatory framework laid down in the Ecodesign Directive will play a key role in the development of better stoves and boilers over the next decade. However, to achieve maximum benefit from such reductions, the Ecodesign Directive should also explicitly cover black carbon. Therefore, additional legislation to support and complement the EU framework on black carbon from residential wood combustion would be beneficial for the Arctic region. In addition to supplementary legislation, research indicates that black carbon emissions could also be reduced through non-regulatory means. For example, information campaigns aimed at influencing how people store and use wood as a fuel and operate their stoves can be a very cost-efficient way to raise people’s awareness about black carbon emissions.

In the light of the analysis presented above this article argues that the exclusive yet quite ‘practical’ context of black carbon and Arctic warming offers the EU a good opportunity to develop its Arctic policy in such a way as to boost its importance and coherence. Environmental and regulatory footprints are among the ‘clear elements’ of the EU’s Arctic role. Within this very central role played by the EU, its institutions could focus their Arctic policymaking on processes that streamline Arctic concerns into their general decision making. This should also include assessment of the

103 Sims et al (n 77) 611-612; MACEB (n 7) 9.
104 Hildén et al (n 26) 1.
105 Levander and Bodin (n 85) 55.
106 Savolahti et al (n 84) 1502; Levander and Bodin (n 85) 56.
107 Savolahti et al (n 84) 1498; MACEB (n 7) 9.
108 Stępień and Koivurova (n 3) 56.
impacts the EU policies and regulatory frameworks have on the Arctic. These processes should take place within those policy areas in which the EU has established priorities and competence to promote and pursue external objectives. Although the EU has not been granted an explicit Arctic mandate by its Member States, EU treaty law provides solid justifications for action in relation to the Arctic. In particular, the TFEU states that one of the objectives of EU environmental policy is to promote measures at the international level to deal with regional or worldwide environmental problems, and in particular combating climate change. The TEU provides that the EU shall contribute to the sustainable development of the earth in its relations with the wider world as well as work for a high degree of cooperation in all fields of international relations to help develop international measures to preserve and improve the quality of the environment and the sustainable management of global natural resources. The EU is free to exercise these competences with a view to mitigating Arctic warming, and the regulatory framework on black carbon fits well within the context of the EU’s internal objectives and preconditions. But what is missing is a clear link between the EU’s air protection policy and its relevance in the Arctic (climate) context of a kind that would connect the EU’s current regulatory efforts in relation to black carbon to global and regional efforts to tackle Arctic warming. This missing link needs to be made.

It has been suggested that climate change and air protection should be ‘tackled together by policies and measures that have been developed through an integrated approach’. However, integrating air quality and climate goals does not automatically lead to better environmental outcomes. Realization of the benefits of an integrated approach requires both active science-based policymaking (as the linkages are complex) and, in all likelihood, the removal of institutional barriers (climate and air policies are often handled by different institutions). However, it remains necessary to evaluate what can be gained from integration and how it can lead to more effective policies. A coordinated policy strategy could help to avoid further unintended consequences – the abatement of one environmental problem should not worsen another environmental problem. For example, the increased use of biomass combustion as a ‘renewable energy’ without adequate emission controls could lead to an increase in PM2.5 and black carbon emissions. Given the increased use of biomass in small-scale appliances, the Ecodesign Directive and its implementing regulations offer a suitable context for the optimal development of measures that would benefit both climate change and air quality. Increased utilization of biomass for residential heating could be effective in reducing the carbon footprint. However, it might also contribute to local emissions of PM and thus have adverse health effects in residential areas. There is a need for more research into the emissions produced by biomass burning appliances to assess the potential impact of the likely increase in biomass burning in urban areas in Europe, and to assess whether the emission limits set out in the Ecodesign Directive’s implementing regulations offer adequate protection for human health.

Integration thus could also improve the cost-effectiveness of policies. Policies that may not be regarded as cost-effective if considered solely from a climate change or an air pollution perspective

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109 ibid.
111 TFEU (n 13) art 191.
114 European Environment Agency (n 62) 12.
115 Maione et al (n 63) 55.
117 ibid; Parliament (n 62), 13; Maione et al (n 63) 54-55.
may be found to be so if these issues are considered in tandem.\textsuperscript{118} It would be possible to develop legislation that addresses black carbon and PM2.5 for the dual purpose of limiting the amount of black carbon emissions that reach the Arctic and of reducing health problems caused by black carbon as a component of PM2.5.\textsuperscript{119} Tackling residential wood combustion and biomass burning offers the EU ‘low-hanging fruit’; tangible positive synergies with both climate and air quality benefits would be within relatively easy reach and at low cost.

Finally, but of course critically given that this article focuses on the Arctic, it follows from the above reasoning that the measures to harness the synergies between climate and air policies should also be communicated within the EU’s Arctic policy.

6 CONCLUSION: THE WAY FORWARD FOR THE ARCTIC?

This article set out to discover whether the EU could enhance its Arctic involvement through its regulatory action\textsuperscript{120} covering black carbon emissions. The EU’s interest in becoming a more powerful Arctic actor finds clear expression in its Arctic policy as well as elsewhere, but to date its approach has been perceived as clumsy and lacking in coordination and coherence.\textsuperscript{121} To address past misunderstandings and to build a more consistent Arctic approach, scholars have suggested that the EU should focus on what it knows best and use this competence to complement existing initiatives and develop cooperation and participation.\textsuperscript{122} This may also imbue the EU’s approach to the Arctic with some much-needed coherence and substance.

This article has sought to show that the EU’s regulatory framework on black carbon and Arctic climate warming could offer a tangible framework for further Arctic engagement. However, bringing this project to fruition would require further attention and informed regulatory efforts in the relevant policy context, and perhaps new legislation at EU or Member State level. The discussion above focused on tapping the synergies between the EU’s climate and air policies. This leads to the thought that the EU could indeed improve its Arctic environmental footprint (and thus also its Arctic relevance) by turning the existing overlaps – which have given rise to regulatory challenges – into positive synergies. This would call for the identification and quantification of the co-benefits between climate and air policies not only for the Arctic climate, but, crucially, to avoid unintended consequences for human health, ecosystems and the climate. Furthermore, these measures would lead to less European black carbon being deposited on the Arctic snow and ice surfaces.

To acquire Arctic relevance by means of such internal EU action, the EU would need to communicate its climate contribution in the Arctic context. The arguments set forth in this article build on the view that EU Arctic policymaking should be steered towards an exclusive framework of activity in which the EU has competence to provide a concrete input that has clear and complementary benefits for the region. The challenge is that of dovetailing actions taken by the EU with those taken internationally as well as specifically within the Arctic region. In this context, which perhaps reaches a little beyond the scope of this article, regional cooperation should be highlighted as providing a potential way forward.

The EU’s internal mandate for external action highlights cooperation. Furthermore, it is not in the EU’s interests to pursue a unilateral approach towards the Arctic. Through its contribution, the EU complements efforts taken at an international or regional level as an active participant in Arctic

\textsuperscript{118} European Environment Agency (n 116) 42.
\textsuperscript{119} Levander and Bodin (n 85) 58.
\textsuperscript{120} While the focus of this article has been on the EU’s regulatory contribution, EU action on black carbon could also take a form of, or be complemented through, projects or assessment initiatives. The EU Arctic Footprint and Policy Assessment project from 2010 is a good example. See Cavalieri (n 34).
\textsuperscript{121} See, e.g., Hossain (n 14) 89-93; Airoldi (n 3) 13.
\textsuperscript{122} A Stępień, T Koivurova and P Kankaanpää, ‘The Region of Uncertainty Arctic Change and Possible Pathways for the EU’ in Stępień et al (n 3) 325.
climate governance. Taking account of the Arctic concerns identified here in EU policymaking in the context of black carbon would also support the EU’s participation in international negotiations (such as those pursued through the International Maritime Organization) and cooperation through international forums (such as the CCAC in relation to black carbon).123 These institutions could offer the EU a platform for its contribution to Arctic governance in relation to black carbon.

Recent research has also found that black carbon in its Arctic context is ‘politically attractive’ for cooperation in small clubs of countries (as opposed to wider international cooperation), which, if well-designed, can achieve a very large proportion of the benefits that could be achieved through wider cooperation.124 Combating climate change ultimately necessitates global cooperation, but substantial progress may be achieved through small clubs of countries, where it is easier to forge and implement the deals needed to bring about policy coordination.125 These findings support the views presented in this article. The EU, as a strong and legitimate regional player, can have a substantial influence on the abatement of black carbon emissions – not only as a sole actor but also as a participant in an exclusive regional group of actors.

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123 Strahlendorff et al (n 19) 66 and 73.
125 ibid 88.